SUSS

Journal of the Sydney
University Speleological Society

Volume 5

Number 1

JOURNAL OF THE SYDNEY UNIVERSITY SPELEOLOGICAL SOCIETY

VOLUME FIVE NUMBER ONE

OCTOBER 1958

-INDEX-

EDITORIAL

When word first spread around SUSS that I was editor of the Journal and was waiting for material, results were not long in coming. Three months later I had numerous promises of articles and three months later still I actually received these articles. As far as I am aware, there is no great shortage of paper or ink, so it would be gratifying if members could show as much interest in writing for the Journal as they show in reading it.

As has been pointed out on numerous occasions this year, SUSS is now ten years old, and this editorial feels it must add its opinion to those that have already been expressed. I listen to the increasing talk of "scientific projects" , "serious caving" "organization" and other shadowy concepts with considerable apprehension, for I fear that the sporting caver (or dilettante if you like) is being pushed into a position of secondary importance. For ten years SUSS has been concerned largely with caving for caving's sake, and I feel that this doctrine is responsible for SUSS's being alive to-day. I also feel that the caving for science's sake could not possibly enjoy such longevity, because of its very limited appeal. I will even go so far as to say that "scientific projects" , far from being necessary, are entirely superfluous to caving in much the same way as botany, say, is to bush-walking. I like to look on caving as a refuge from science, rather than as an extension of it.

It will be noted that this Journal contains more satire and less science than others. This comes about partly as a result of the above views and partly because nobody seems to write scientific articles anyway. However, with the SUSS decenary Journal coming out some time later this year, I exhort members to start writing articles now to ensure that this unique journal will be a success. Material on the early days of SUSS would be particularly welcome.

Finally, I would like to thank those who have given so selflessly of their time to help this issue come into being.

K. Stillman

FROM THE PRESIDENT

This year SUSS is ten years old. During these ten years, great changes have taken place in the Society, and yet it is still just what it always was.

The young society was small, and yet its programme for its first summer must have left the members well satisfied if, indeed, they succeeded in carrying out more than a portion of it. There was, of course, plenty of work waiting to be done, as no organised study had been made of the caves of NSW since the days of Oliver Trickett many years earlier. There still remain many caves, which because of their inaccessibility, or small extent, have not received any systematic attention at all.

SUSS was formed as a University society by undergraduates, although others have always been eligible and welcome members. This has one curious effect. As the members complete their courses and graduate, many leave Sydney, or otherwise become unavailable for society activities. Because of this, and because of University requirements, the control of the society has remained with the undergraduates and other University-inhabiting members. As a result, most of the recruits to the society come from the ranks of the undergraduates of the University and the cycle continues. It was with this in mind that I said that the society has not altered - as always, its activities are limited by the shortage of time and money common to all undergraduates, and by the lack of facilities for producing equipment. In spite of all this, the society has survived these first ten years.

Our aims have, however, changed. Much of the obvious work of exploration and re-discovery has been done, and we are now involved in long-term excavation programmes, and virgin exploration largely in the remoter caves only. As the opportunities for simple exploration have narrowed, so have other activities expanded. The society now interests itself in the problems associated with caving, on which little work has been done locally. Groups are finding interest in the study of cave origin and development and in foul air; in the Geology of cave areas, and survey techniques.

It may be that our work in amateurish and shallow as yet, but if it is given the support that it deserves, it should develop into a movement that will benefit the world of Speleology at large.

Adrian Hunt.

FOUL AIR IN CAVES - MOLONG AND WELLINGTON NSW

Noel R. Fraser.

The problem of "foul air" in caves has interested this Society for some time. Old papers on this subject are remarkably inaccurate. In 1950 one of our members (1) placed 7% as the concentration at which collapse and death would occur. Only three years later another writer (2) gave the minimum fatal concentration as 25 - 30%. However this dangerously inaccurate figure was gained by reference to medical text books rather than by practical observation. The figures given by the most recent contributor on the subject (3) appear to be much more accurate.

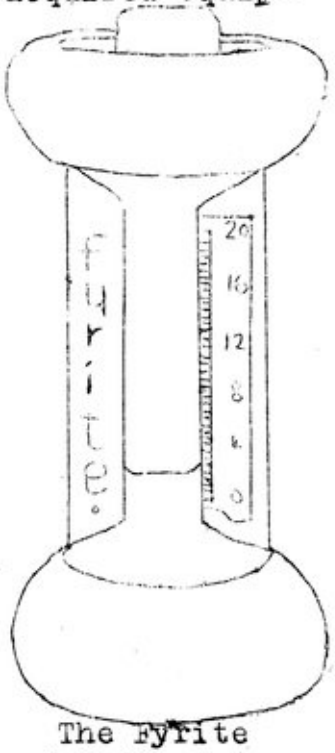
Early this year three trips were organised to caves at Molong and Wellington in Central Western NSW, with the object of assessing the concentration and at the same time gaining experience in the use of the Society's recently acquired equipment under practical conditions.

EQUIPMENT USED.

Fyrite Carbon Dioxide Indicator, Model CND.
Fyrite Oxygen Indicator, Model CPD.

The above equipment was chosen for the following reasons:

1. Each indicator is packed in a small (4"x8"x10") steel box, and has a weight of 5lb. This allows easy and safe carriage into confined spaces.
2. A high degree of training in operation is unnecessary.
3. The accuracy of a reading can be rechecked immediately, using the same sample of air.
4. Consistent results are obtainable, even though a high degree of accuracy is neither necessary nor easily attainable.
5. The apparatus is inexpensive to maintain and operate.



The Fyrite Indicator.

PRINCIPLE

In each case the principle is the absorption of gas into a suitable liquid, which then gives a direct reading on a calibrated scale. The apparatus is self-checking in that the same sample may be re-used to check the reading.

Method

After zeroing the indicator, the sample is secured by replacing the air in the indicator with the air to be tested. The indicator can then be removed to a safe distance to secure a reading.

SAFETY PROCEDURES.

All members are previously trained in the collection of the gas sample and the operation of the apparatus. The party should consist of four or five experienced speleologists, who may be termed 1. Sampler
2. Leader
3. Relief
4 & 5. Recorders and reserves.
Where practicable, the first three members of the team should be roped together, using about 15-20 feet of safety rope between each, to facilitate and speed rescue in case of collapse.

It was found advantageous, especially in high concentrations of foul air, for this team to pivot about the leader. In this the sampler of the first test became the relief for the second test, and vice versa. This gave the samplers, alternately, time to recover between tests, without the need of untying safety ropes.

However, all positions are interchangeable, and it is advisable to change these positions frequently, including that of the team leader in No 2 poistion. In this way, a high degree of safety and lack of fatigue was achieved.

Nevertheless, considerable self-discipline is required between members of the team, because the foul air results in a feeling of lassitude and a dulling of the senses that is apt to make one take unnecessary risks. The force of this argument was fully brought home on one occasion when a member in a high concentration of gas attempted to examine a squeeze-hole against the orders of the leader at the time. Only quick and firm actio here, with a certain amount of luck, prevented an accident.

Future advances in this work will necessitate the use of self-contained breathing apparatus. The problems to be overcome with regard to communications are similar to those at present receiving attention in cave diving, and no doubt similar means will be used to overcome them.

RESULTS

MOLONG EXPLOSIVES CAVE.

This little known cave occurs on the side of a hill about 1 mile from Molong township. The entrance is beside a small ruined shed once used to store explosives used for quarrying operations nearby. The rocks at the entrance show evidence of blasting. The cave consists of a near-vertical shaft, decending for some 30 feet to a squeeze-hole. Although climbing is extremely easy, a rope and ladder were used for safety. At the entrance there was a stuffy, warm smell, and the lamps began to smoke as soon as the foul air was encountered. Breathing became difficult and as the concentration increased to about 8% Carbon Dioxide, headache and tiredness in the legs became apparent.

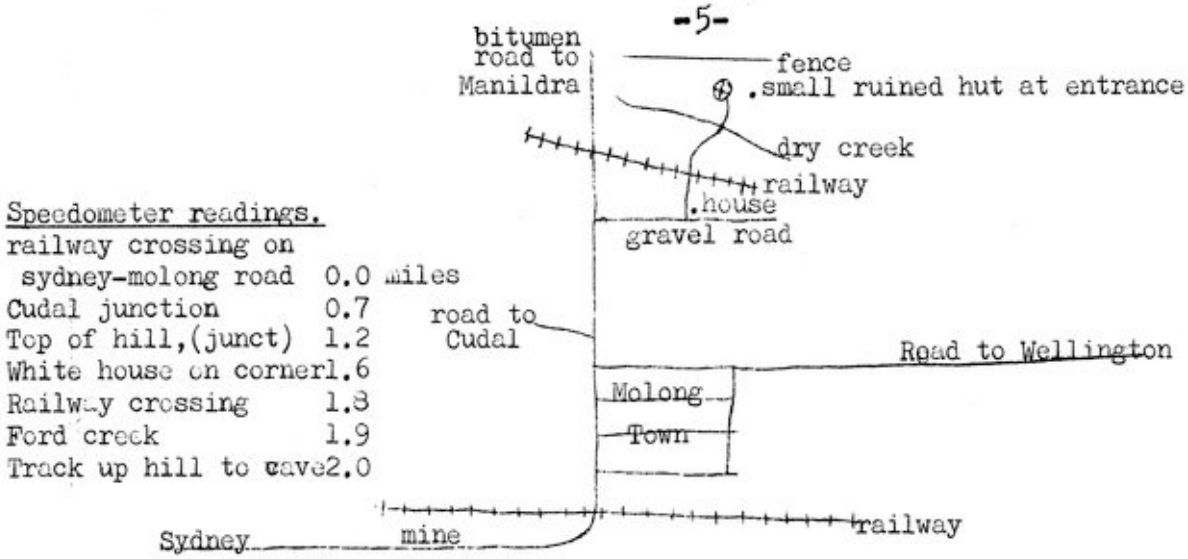


Fig.2. Sketch map of Molong Area.

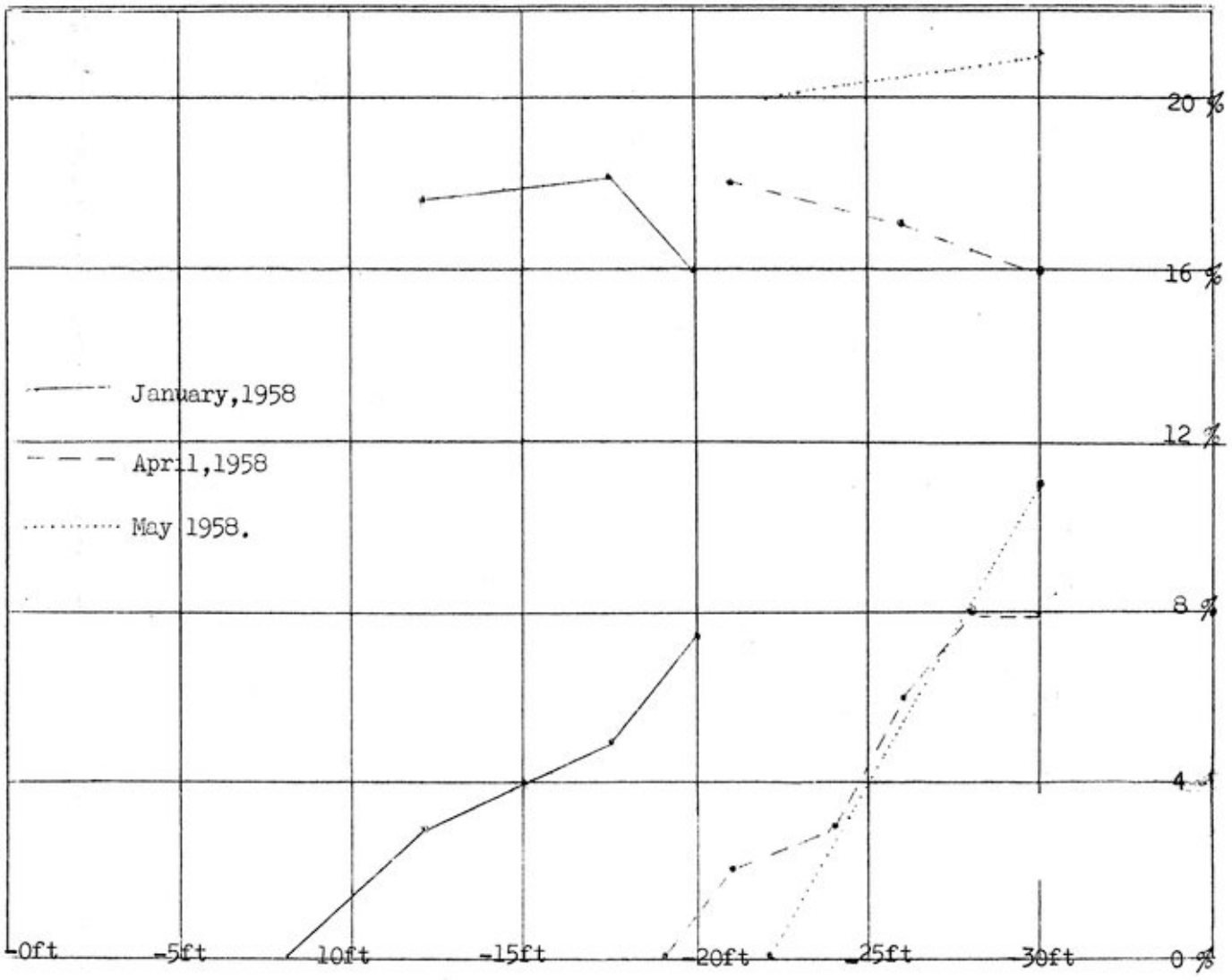


Fig.3. Composition of Foul Air in Explosives Cave, Molong.

On the January and March trips it was found impossible to stay for more than a minute on the floor of the cave. Although the concentration of Carbon Dioxide was lower here than in caves visited later, members on the whole felt more uncomfortable. During May, the higher percentage of Oxygen present resulted in much less discomfort. The speed with which the concentrations increased with a small increase in depth, and the low Oxygen readings, were a feature of this cave. This, coupled with its ease of access and the steepness of the sides, as well as its proximity to the town, makes it somewhat of a danger to unsuspecting amateurs, and especially children. As it is totally lacking in formation and there are many other similar small holes dotted over this hill, but free of foul air in dangerous concentration, the auth r takes the unusual course of suggesting its immediate sealing.

Many other caves in this hill were examined, but most were free of foul air, and others contained up to 2% Carbon Dioxide throughout.

GAS PIPE CAVE. WELLINGTON

This old tourist cave is situated on the lower slopes of the hill where most of the Wellington tourist caves have their entrances. It consists of a vertical shaft with several horizontal passages leading off at the bottom. At the entrance is a quantity of decaying vegetable matter, and this gives off an oppressive and rather offensive odour. However, readings taken in this area were identical with those taken in the outside air.

During January, foul air was encountered at the 21ft. level, but unlike other caves, the concentration remained at a reasonably static level (2-3%) throughout the full length of the cave, to a depth of 48 ft. The air was cool and fresh, and the only physical indication of foul air was a slight smokiness of lamps. Half an hour was spent in this concentration, and although the work out-put was low, breathing was deep, but there were no ill effects and it was quite a pleasant sensation. During March, foul air was not found until near the bottom of the cave (42ft) but it now occurred in widely varying concentrations. Close examination of the floor and walls showed several small holes where concentrations of 4.5% were found. Under these conditions one member of the party developed giddiness and nausea and returned to the surface where recovery was immediate.

The May trip encountered even higher concentrations of Carbon Dioxide (up to 6%), throughout the cave, but the relatively higher oxygen concentration resulted in comparatively minor discomfort.

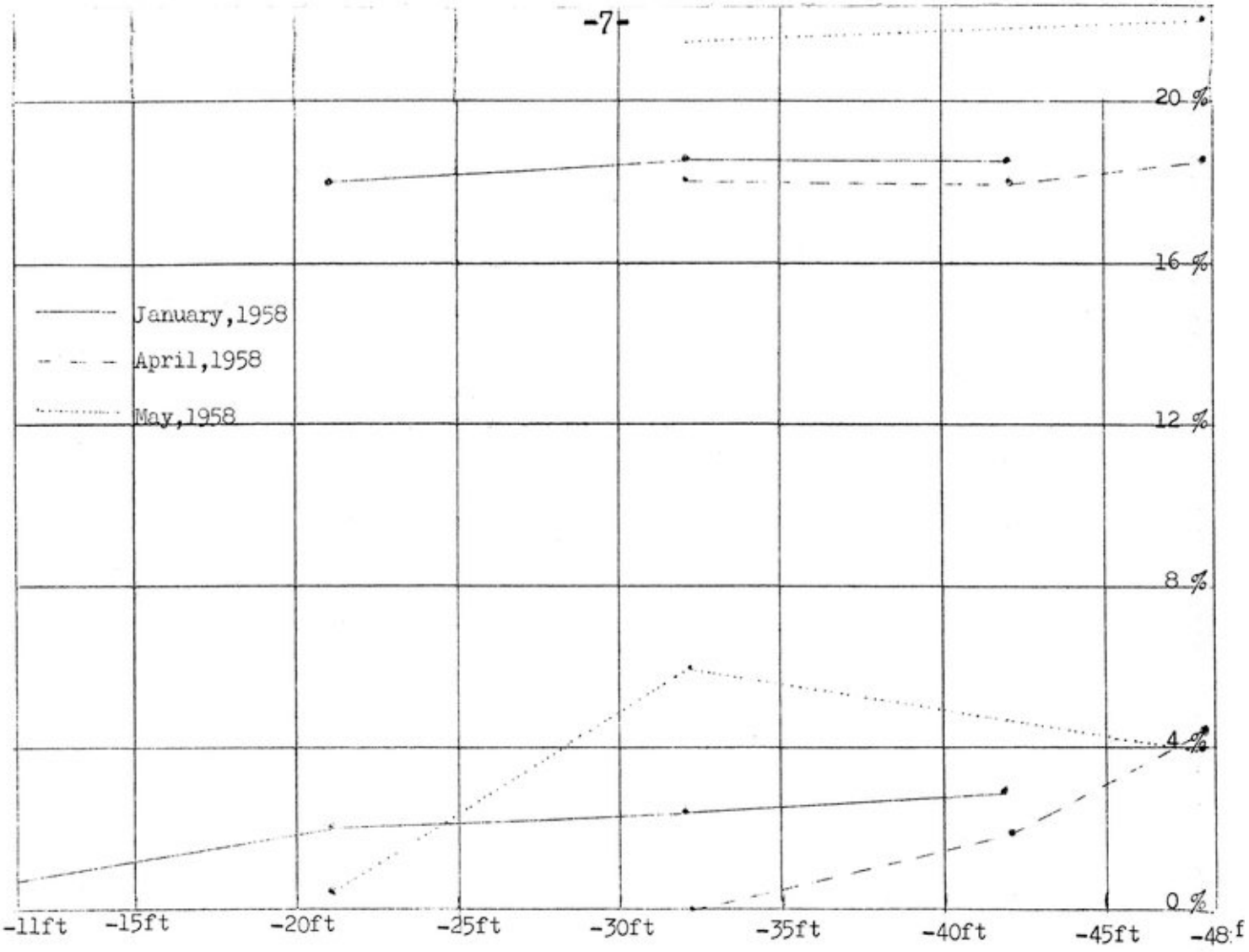


Fig.4. Composition of Foul Air in Gas Pipe Cave, Wellington.

GADEN CAVE. WELLINGTON

The Gaden Cave is a tourist cave with entrance on the top of a hill. After decending steeply for some 20 feet, the cave branches to the left and right, and each branch extends to a depth of approximately 75ft. The left branch contains the better formation and is the main tourist attraction in this cave. On no occasion was foul air found in this section. The right branch contains a small amount of formation and is likewise free of foul air, but near the 45ft. level, a horisontal shaft has been driven to the left for some 15 feet, and this has exposed a small cavity, about 9ft by 15 ft, and 9ft high, devoid of formation. In one corner a small hole drops to the floor. Access to the floor of the chamber is by wooden steps for 10ft. then by stone steps for a further 10ft.

The cave was notable in that it provided the three highest readings of Carbon Dioxide recorded on the survey, i.e. 12%, 12.5% and 13.5% CO_2.

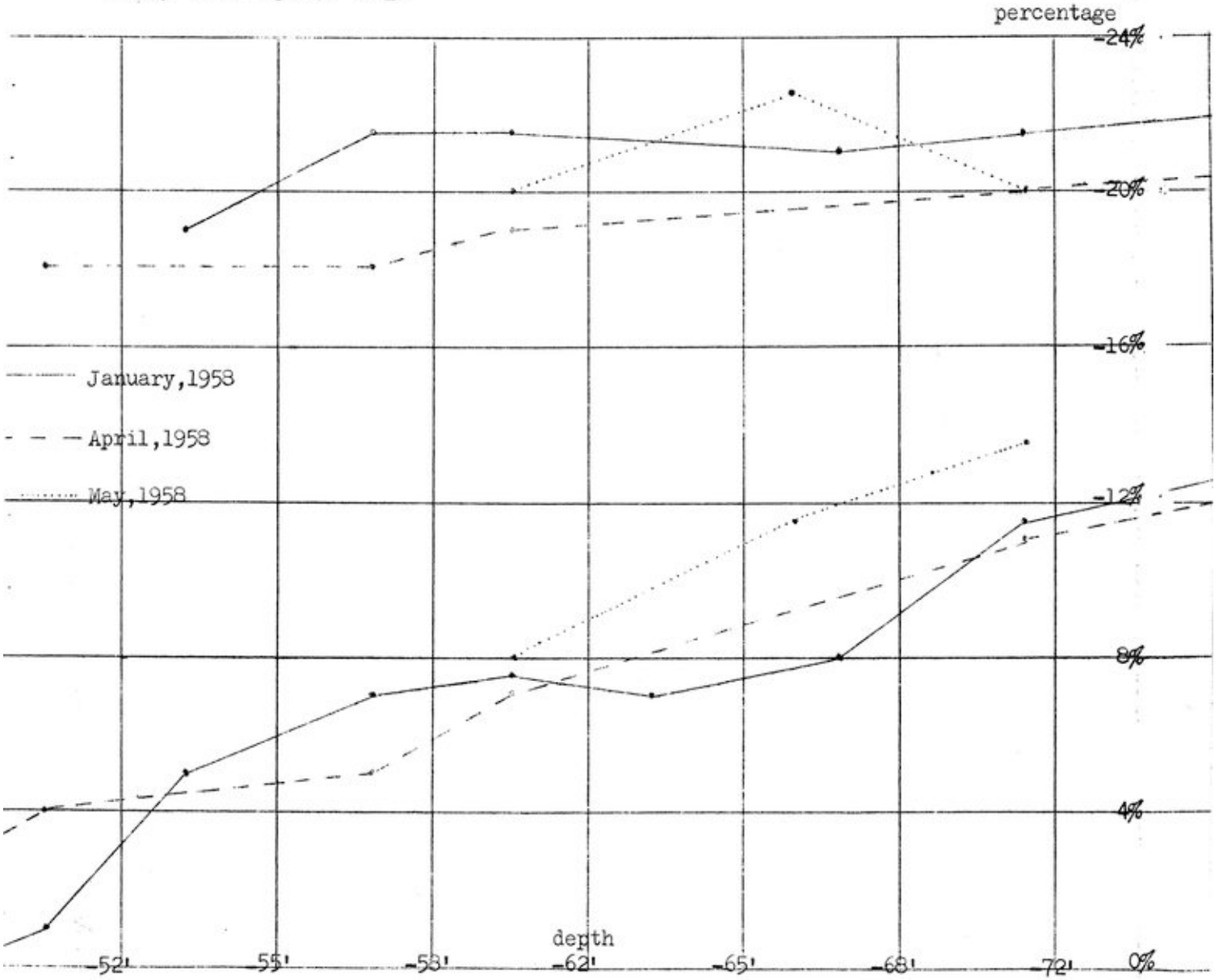


Fig.5. Composition of Foul Air in Gaden Cave Extension, Wellington.

The most recent published recording (4) taken in December 1954 and using a completely different method of analysis, gave 12.4% Carbon Dioxide and 9.2% Oxygen. There readings are comparable with those shown above. On each of the trips by this Society the foul air was encountered at similar levels and in similar concentrations.

It would appear to be an excellent cave for the study of foul air since there is not only a full range of concentrations, but the cave is equipped with paths and steps. This means that a minimum of energy is expended in reaching any section , and in this way, a truer picture of the physiological effects is obtainable. In addition, it enables quick and easy rescue in case of accidents.

At 48 ft. the air is cool and pleasant, but acetylene lamps smoke immediately the foul air is encountered, several feet below.

At 60 ft., in a concentration of 7 to 8% Carbon Dioxide, lamps still remained alight, but breathing rate increased considerably. Several members complained of headache, which left shortly after return to fresh air. After resting for some time , the author on one occasion sat in a concentration of 7% CO_2 for over ten minutes without ill effects. At the end of this time the pulse rate was 104 per minute, (average normal is 72), and the respiration rate was 37 per minute (average normal is 14).

As the Carbon Dioxide concentrations increase, the acetylene lamps became more smoky and burned with a blue flame, emitting less and less light. With further increase in concentration, the flame burned up to half an inch away from the jet, before finally going out at about 10% Carbon Dioxide. At this concentration breathing is extremely difficult, and no member was able to spend more than approximately half a minute in obtaining the sample. Even after this brief exposure, most members experienced giddiness, pains in the chest and throat , and muscular incoordination, resulting in stumbling and weakness in the legs, and disturbances of vision.

CONCLUSIONS

It became apparent that foul air is far from homogeneous in that widely varying results could sometimes be obtained in a small area. The fact that these readings could be re-checked, and also repeated to give similar results indicates that the gas occurs in pockets rather than an error in the apparatus.

In Figs. 3, 4, and 5, the lower line represents the concentration of Carbon Dioxide, and the upper line, the sum of the concentrations of Carbon Dioxide and Oxygen. Thus the intervening area represents the Oxygen concentration. It will be seen in the greater number of cases that this upper line is almost horizental, thus indicating that the percentage of inert gases (mainly nitrogen) present, is reasonably constant.

If the Carbon Dioxide were generated at a depth in the earth's crust, and gradually seeped to the surface, it might reasonably be expected that both nitrogen and oxygen would be replaced in proportionate amounts, and a rise in Carbon Dioxide concentration would be accompanied by a fall in the concentration of both nitrogen and oxygen. However, this is not the case, and while the nitrogen remains constant, the rise in carbon dioxide level is accompanied by a proportional fall in the oxygen level.

This would appear to indicate that the carbon dioxide is generated in or near the cave itself, and so merely replaces oxygen which has been used in its production. The process is probably one of organic decomposition.

SUMMARY

Foul air is present in some caves at Molong and Wellington in a dangerous concentration,

Foul air is produced in the caves and does not arise from a great depth.

REFERENCES

(1) SUSS Vol 1 No 1 page 11 (reprint)

(2) SUSS Vol No 1 No 2 page 11

(3) SUSS Vol No 2 No 2 page 17

(4) SSS "Communications" No 1, page 47.

ACKNOWLEDGEMENTS

Alfred Scashall Pty. Ltd. agents for Pyrite Indicators, for donation of indicaters.
Mr. Sid. Barrett, Wellington Caves Caretaker and Guide, for assistance.
Orange Speleological Society, for valuable information and assistance.

The occurrance of foul air is of considerable interest to this Society, and any further information and comments would be appreciated by the author.

FLIGHT NAVIGATION IN BATS.

Nola Bosworth.

Bats are the only mammals that have become specialised for flapping flight. The wing is formed from the fore-limb, and consists of a fold of skin supported by all the digits of the hand except the first, and extending along the sides of the body to include the legs and usually the tail.

The bats found in caves belong to the sub-order Microcheroptera and are highly modified for flight in the dark. The bats are able to avoid obstacles in complete darkness, even with their eyes blackened, however if the bat's ears are blocked with wax the bats lose their ability to avoid obstacles. It has been found that they avoid obstacles mainly by a system of echo sounding. They send out super-sonic vibrations that are reflected back to the ears.

Naturalists found that bats gave out four different classes of sounds; 1) A shrill cry with a frequency of 7 kilocycles or

7,000 cycles per second, perceptible to the human ear, and continueing for about a quarter of a second. 2) A buzz, not audible unless the observer is quite close to the animal. 3) A very rapid and hardly perceptible click, and finally 4) The supersonic "cry", imperceptible to the human ear, of frequencies varying between 30 and 70 kilocycles. Those between 40 and 50 kilocycles are the most common.

A bat in repose gives out on the average, 5 to 10 of these "inaudible" cries each second; but when it takes flight they increase in frequency to 20 or 30 per second, and each reach 60 in the vicinity of an obstacle. Buzzing and clicking always accompany the emission of supersounds.

These supersounds are reflected by the object to be avoided and the "echo" is in turn received by the ears of the animal which can thus perceive the distance of the object.

The bat can distinguish the "echo" from the "inaudible cry" that gives rise to it, because during the emission of the supersounds there is a momentary contraction of a minute ear muscle that puts the ear out of action while the squeak is being made, so that the bat's hearing is not temporarily paralyzed by the loudness of its own squeal, but is keenly awaiting the echo.

The range of this supersonic "radar" is not more than five yards , as the "inaudible cries" do not carry further.

Bats are able to distinguish the "echoes" reflected by the obstacles to be avoided and the insects which they catch in flight, but it is not yet known how they do this.

Bats with this "radar" system are adapted for cave life, as they can fly among the labyrinths and avoid all obstacles.

CAVE CREEK FAUNA.

A. Hunt.

(Cave Creek is located in the Monaro district, not far from Yarrangobilly).

One of the delights of visiting a remote area is the abundance of wild life that presents itself for study. The two trips that have visited the area have been severely limited by time and weather, but have nevertheless been able to make a number of observations.

The bird life of the area is prolific and unmolested, with robins, wrens and honeyeaters sharing the campsite quite happily, and the mimicking of the lyre-birds is almost always to be heard.

Winter in this area is hard on the animal life. Sheep and cattle missed from the muster and also wild goats live in these hills, but those who visited the area in Spring found many more skeletons than had been present in the Autumn. The native animals, however, appear to be flourishing. As usual the wombats are the most prominent representatives of these, and the party was observed in a casual way by quite a number of these glossy, well-fed fellows, who leant on their metaphorical elbows at their burrow entrances to watch us toil past.

One find that has been of great interest is that of the Bird of Paradise Fly (Callipappus australis). These insects are of the family Coccidae and the sub-family Margarodinae , and are the largest of the Coccid flies. Only the females have been found so far, and these are large, wingless insects, about $\frac{5}{8}$" in length and quite fleshy. The colour varies during the year from slate-grey with a white powdery secretion on the dorsal surface in Autumn to a red-grey lacking this secretion in Spring.

As the females prepare to larviposit they become less mobile, until finally they attach themselves to the underside of a stone by means of an abdominal secretion. Specimens of both the mobile and immobile stages have been obtained for the Zoology School collection.

The males of the species are small and very beautiful, having glossy forewings of about $\frac{1}{2}$" wingspan, and two long filaments, or a bundle of fine white filaments resembling spun glass at the posterior end of the body. The bodies are red in colour and the wings pink.

A feature of great interest to us is the distribution of the insects in the area. The region is highly metamorphosed, the rock types being marble, chert and Hedenbergite. As yet the insects have been found only on the Hedenbergite, although further work in the area may reveal them to be present on the other rock types as well. If this is not found to be the case, then the problem of finding the explanation for this distribution will have to be faced.

For the little that is known of the Callipappus australis see R.J.Tillyard: The Insects of Australia & New Zealand,1926.

S.U.S.S. DINNER.

Kel Stillman.

On the 24th of July S.U.S.S. held a dinner at the University to celebrate its tenth anniversary. The dinner was well attended and those present had a thoroughly enjoyable time. By the methods of hypnosis used with outstanding success by Mandrake, but as yet little understood by science, I have been able to record the stream of thought of one of the participants (not myself).

6.25: Sherry served in 5 minutes, better move in. Sick of TV anyway. Where's it being held? Holme & Sutherland, Withdrawing Room? There are some people in suits— they're S.U.S.S..Ah, here we are. Where's the steward with the sherry? Catch his eye when he comes round. "Two dry, please— no, honest, one of these is for one of my friends." That fooled him. Better join this group near the door. Be sociable; can't make a pig of myself. Might get back to B. Those sherries went fast, better tune in to conversation. Sounds like Cave Creek trip. Thank goodness steward is here again. Go on, don't be afraid, take two. Nice sherry this, could drink a lot of it. Better not, leave room for later. Slips down easily though. Have one more before dinner. Got to be sociable. More and more people coming; go and talk to them. People talking louder and faster now. WHO EMPTIED MY GLASS? Don't be silly, of course there's another bottle.

Find out where I'm sitting. Must be other table. Ah, that card's got my name on it. Can hardly read it, very badly written... They're serving the soup now. Could use something to drink— hope the claret comes soon. Here it comes now. Make sure steward fills glass up. "You just saved me from dying of thirst." There it is, dark red liquid with the light glinting dully through the depths. That's very poetic— poem for the Journal. Like Omar Khayyam: "divine high-piping Pehlevi with wine, wine, wine, red wine." Yes please, fill it up again. Should have bigger glasses. Excellent food but these chips are hard to handle. Whenever I turn round someone fills my plate and empties my glass. Yes, again please. What's that song they're singing? Something about Marlboro. I'll start singing Jim Doolan. Others joining in, sing louder. Uh, uh, I'm only one singing. Hell, President's talking, better shut up. People looking, crumble bread roll. Nothing wrong with me, sober as the next man. Clap loudly at finish. Here's steward again, sink a few quick ones before he goes. Claret finished. That's bad organisation: no confidence in sub-committee. Never mind, beer coming. Have to go outside first....That's better. Dark in here, films showing. Grab a bottle and go outside, sit on veranda. Others out here looking worse for wear. Go back inside and sit down. Can't understand these films, shocking sound track. Pretend I can understand; laugh every now and then. Hullo, bottle empty, buy another. Plenty more where that one came from.

Somebody's gone horozontal. Quick, get him outside,men. I know a good cure,put him over this seat. He'll be all right soon. Dinners never hurt anyone. Get inside and finish that bottle. 11.30 already! What happened to hours in middle? Can't remember them. Get a lift home and sleep it off. Awful taste in my mouth. Good dinner though. Wouldn't have missed it for anything.

REPORT ON YESSABAH CAVE AREA

Data collected on trip in May 1957 consisting of Chris Court and Alex Jones and May 1958 consisting of Chris Court, Alex Jones and Warren Peck.

The Yessabah area lies about 8 m.WSW of Kempsey along a fair gravel road. There is only one prominent hill composed of limestone in the district, and this rises to 360' above the surrounding flats. There is an active quarry on the NE side of the hill. The most outstanding outcrop is 250' uphill on the NW side. The belt of limestone extends into the flats on either s . : but all the caves seem to be on the hillside.

The limestone is extremely weathered, with oubliettes,fissures, tunnels,funnels and knife-like ridges. These together with the friction caused by the stone's coarse grain and pronounced rill weathering make the going fairly arduous. The limestone does not compose the whole hill but is clearly marked off from the rest by its strange overlying vegetation which includes Moreton Bay figs with massive roots spreading for many yards, and, regrettably, stinging trees of all sizes.

Any number of cracks and holes leading into small caves and solution passages can be found but sooner or later all are blocked off by clayey soil. The map designation 'Yessabah Cave applies presumably to a cave about 150' above the quarry and some distance E of it which has the remains of an aerial ropeway at its entrance and was formerly used as a source of guano. It consists of one single chamber about 70' across and all lead-offs are blocked by soil. A bigger cave is situated slightly to the west of and about 70' below the most outstanding outcrop (see above): a passage about 50' long leads into a cavern about 100' across, all lead-offs being blocked by soil. It houses a bat colony and a number of frogs. Other lesser caves were entered but a shaft near and aa cleft in the prominent outcrop mentioned above were left unexplored for lack of equipment.

There are possibly some other caves, since although the area where they could occur is small and clearly defined the writers of this report did not have time to check all of it.

GEOLOGY OF THE YESSABAH DISTRICT.

The Yessabah Caves are situated in a belt of Crinoidal Limestone of Permian age. The limestone belt is in the middle of the Macleay Group of the Hunter Valley. The Geological succession in the Yessabah area is as follows.

P	M	B	
E	A	E	Quartzites.
R	R	D	Quartz veins and silicified limestone.
M	I	S	Yessabah limestone (crinoidal limestone ca.300' thick).
I	N		Shales 500-600' thick with occasional limestone bands.
A	E		Shales with abundant Bryozoans & Brachiopods.
N			

Unconformity

Carboniferous Glacial Beds.

The area has been much affected by folding and faulting, especially during the Hunter-Bowen Orogeny of the Permian period. The strike of the limestone at the quarry at the foot of Caves Hill is almost due N and the beds dip easterly at 40 degrees. In areas away from Caves Hill the dip is steeper.

Caves Hill has been preserved because of the comparatively low angle of dip which has enabled the overlying silicified beds and quartz veins to act as a protective cap to the limestone against erosion. However in areas away from Caves Hill where dips exceed 60 degrees the silicified beds have been unable to protect the limestone against erosion and it forms low ground rarely higher than 20 feet above the water table.

The Yessabah Limestone in the vicinity of Caves Hill is markedly crystalline as a result of metamorphism, and fossils are not visible except on some weathered limestone surfaces. The fossils seen were crinoid stems and one pelecypod, genus Eurydesma, which is a characteristically Permian genus. Although massive in places the limestone has a strongly developed bedding with partings spaced at 10"-18" apart. As it contains only 3½% impurities, the limestone weathers to give a sparse supply of soil, most of it being dissolved and carried away in solution. Rill weathering is exceptionally well developed, and the whole area is an excellent example of karst topography.

Specimens of the limestone have been analysed by the Mines Department and the following is the average:

$CaCO_3$	96·5%
$MgCO_3$	1·5%
Al_2O_3 & Fe_2O_3	0·5%
Gangue	1·5%

YARRANGOBILLY

Ray. Smith.

The caves at Yarrangobilly (Y'by) can be arbitrarly divided into several classes....

1) The tourist caves in the vicinity of Caves House.
2) The Eagles Nest system .
3) The Deep Creek system, and
(4 The Coppermine system.

The following is a summary of the work done and the possibilities existing in these systems..

1). The Tourist Caves.

There are no records of any work done by SUSS and only recently a small amount of mapping has been done by other societies. The surveying of this system would be a major under-taking, probably best left to a Federation trip.

2). The Eagle's Nest System .

This system consists of two caves: The Eastern Eagle's Nest (EEN) and Western Eagle's Nest (WEN). The Eagle's Nest Creek flows into the entrance of the EEN, and this same creek once flowed into the WEN. The WEN has two entrances, one of the rocky side of the sink-hole, and one in the valley, presumably the old water course.

The efflux of the EEN has been definitely established by fluorescein test (Fred Stewart, Brian O'Brien 1953)and it is situated a little upstream from the Natural Bridge (on map). From Trickett's Survey it is some 2,500 ft. West of the creek entrance. From the map EEN (Fred Stewart, Brian O'Brien 1953) Grade 1V SUSS 2 1, the cave proceeds in a roughly Westerly direction for a distance of 1,500 ft., that is, more than half way to the efflux.

The passage mapped in the above survey is the original water course of both EEN and WEN (the junction of which was established on Don Adamson's trip in 1957. The present water course disappears in a mud sink a short distance inside the cave.

It would be a notable achievement if the E and WEN caves could be connected with the efflux. This would probably involve re-connection with the existing water passage at some stage past the mud sink. One possibility is by way of a lower level, which is visible in the last 200 ft or so of the above-mentioned passage. However, those fissures in the floor observed by the author , were un-negotiable without ladders or rope, and appeared to be of crumbly dirt and very dangerous. It is hoped that a good deal more work will be done on this system in the near future.

3). The Deep Creek System.

For convenience the Deep Creek System is considered as

containing three caves: East Deep Creek (EDC) West Deep Creek(WDC) and North Deep Creek (NDC), which may or may not have the same efflux.

The efflux of none of these caves is known. It was thought for a long time that the Deep Creek system and the Eagle's Nest system may have had a common efflux, but this was disproved on a trip in 1958, when 2lbs of fluorescein was placed in WDC at 11 p.m. one night and a watch was kept on the EN efflux from 7 a.m. to 7 p.m. the next day, and no sign of the fluorescein was observed. No systematic search was made of the river upstream, due to the ruggedness of the country and the small number in the party. The discovery of this efflux is a MUST for future work in this area.

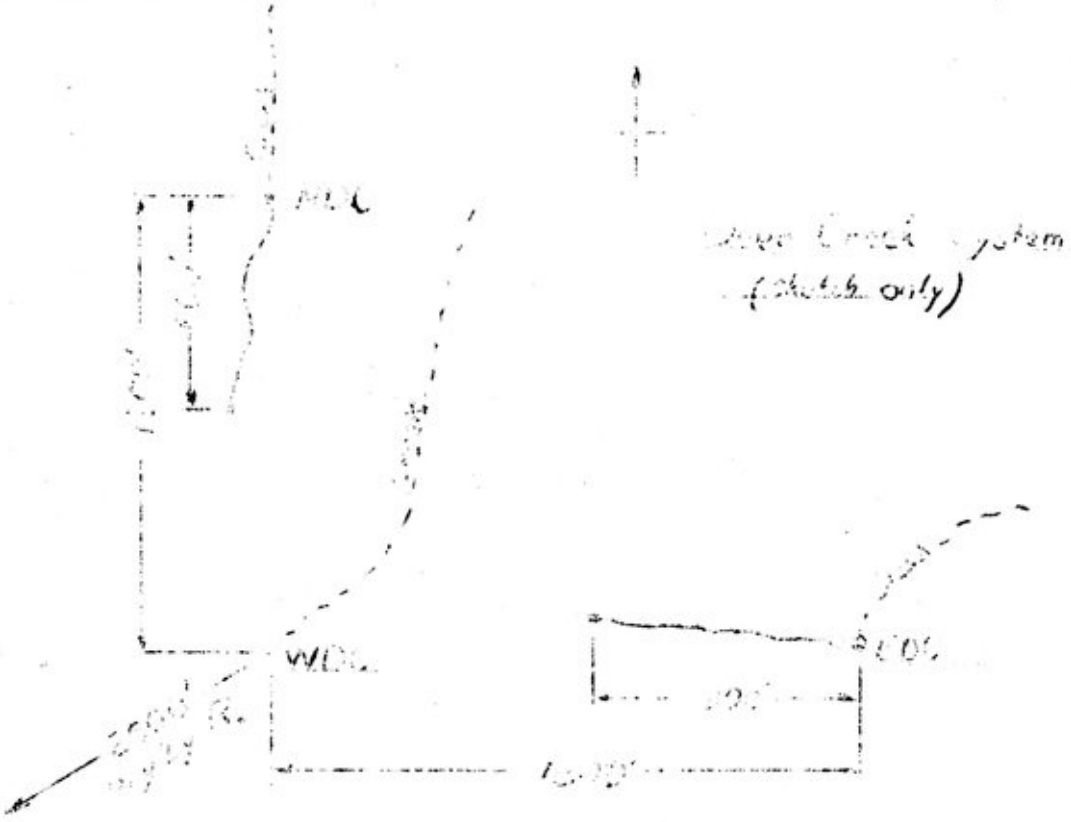
East Deep Creek cave consists essentially of three parts.
(1) The middle level containing some of the best formations and the calcified remains of a wallaby, is the best known section. However, there still remain possibilities for future work - particularly in a dry season when the siphons, which normally prevent further exploration, may be penetrable.
(2) The lower level which follows the present river course for almost 1000 ft. in a direction slightly North of West. This section is somewhat difficult to traverse in some parts, requiring continued crawling through low passages and often through mud and water. The passage ends in a mud blockage, which would require extensive digging to clear.
(3) A section starting above the entrance, just inside the cave, and easily confused with the entrance when leaving the cave. Little serious work has been done (at least by SUSS) in this section, but members of the Canberra CC have estimated the length at some 2000 ft. The direction is at present unkhown to the author.
Maps of the complete section are being prepared by the Canberra CC.

The cave, then, is a large one with ample scope for a good deal more work.

West Deep Creek . SUSS does not possess a map of this cave, and little systematic work appears to have been done. There are reports of penetrations of up to 1000 ft. In one attempt the author found the way blocked by a fast moving stream flowing through a fissure about 200 ft. inside the cave. A creek also flows in through the entrance.

Herein lies the possibility of future "vast innumerables". This cave is probably unique at Yarrangobilly for the sizeable cross sections and the enormous rock-piles. "Boulders as big as houses" is a commonly heard phrase in this connection. On entering to any depth, considerable caution should be exercised to prevent undue risk to the party.

North Deep Creek. The entrance to this cave is in a valley about a quarter of a mile north of W.D.C. There are four possible entrances in the valley - and the one furthest from the present river passage is the only one to have been thoroughly explored This cave passes down through a deep rock-pile to the present river passage, where it continues along for a distance of about 600 feet slightly West of South - i.e. towards the W.D.C. sinkhole. The cave ended in a siphon, which the author considers could be cracked quite simply. An attempt will be made at the Christmas vacation.



The relative positions of the Deep Creek Caves are shown in the diagram. It seems likely that these caves could be connected, and more work should be done with this end in mind.

Coppermine Caves. There are few reports of work done by SUSS in any of these caves. A report of January 1956 of a trip by Ted and Jenny Anet is the only one on hand, and the following discussion is based on this report and on hearsay. It is desirable that SUSS records be brought up to date on this system.

From the above two sources the following can be deduced :

There are five entrances (see sketch), each with a creek flowing in, and at least one efflux on the Yarrangobilly River.

Entrance (1) is a mud-sink and does not look encouraging.

Entrance (2) has 200 feet of passage and ends in a siphon.

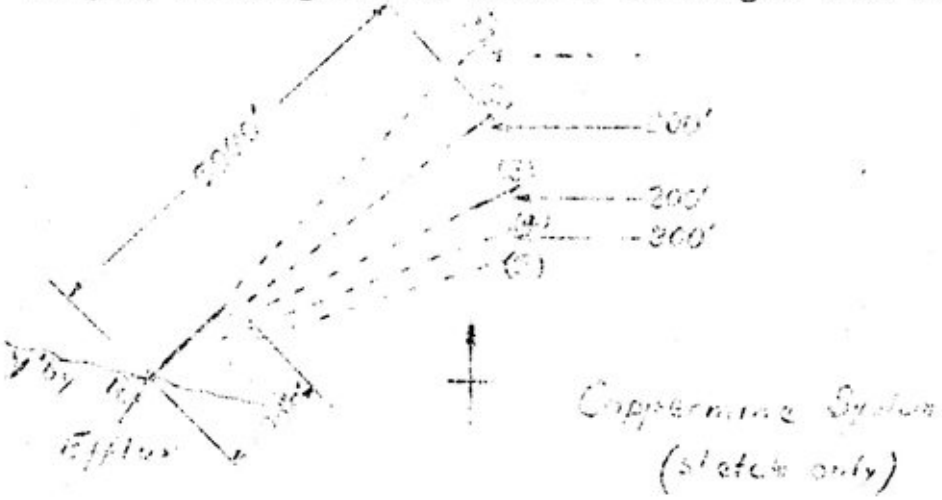
This siphon might be passable in dry weather, or else a sandy by-pass could be dug out.

Entrance (3) contains the largest creek. This creek disappears in a narrow cleft 200 feet inside.

Entrance (4) continues for 300 feet and ends in a gravel sink offering few possibilities.

Entrance (5) is a swamp, permeable only to water.

The efflux on the Yarrangobilly River leads to a cave of unknown length, although it is said to be longer than 1000 feet.



The distance between the two ends of this system is considerable, and the chances of linking entrance with efflux do not appear to be great.

Apart from the possibilities discussed above, there is ample opportunity for ground exploration. Results of work being done by other societies is being obtained, and should be available in the near future.

This review is necessarily brief, and it is hoped that the lack of detail has not over simplified the position.

HUFF AND PUFF: AN ODD HAZARD IN SPELEOLOGY.

By F/Lt. D.T.Burke, RAAF School of Aviation Medicine, Point Cook. V.

The definition of a new hazard in Speleology at this late stage will probably come as a surprise. I am referring to the procedure of hyperventilation, a condition in which the rate and depth of breathing are abnormally increased.

The whole thing sounded so harmless that it was only in the 1940's that the sinister aspects of hyperventilation were first mooted and later confirmed. Consequently, our knowledge of the subject was in its infancy when Casteret wrote his "Tenebres", but in the past few years extensive medical research has shown that hyperventilation can produce a variety of symptoms and even serious results. From data now available, a clear picture can be presented for the first time of overbreathing as a hazard in Speleology, and this will be illustrated by several cases.

Perhaps the most peculiar feature of hyperventilation is the ease with which the hazard can be avoided once a person is acquainted with the theory of the condition .

Physiology

To appreciate the nature of the problem, an understanding is required of the physiology, which will be explained in simple terms. In ordinary quiet breathing, some oxygen in the inhaled air is utilized and replaced by carbon dioxide, and the rate and depth of breating are automatically adjusted to maintain, in the lungs, a constant reserve of CO_2 (6%) which controls the rate of diffusion of CO_2 from the blood.

When extra CO_2 production occurs, as with exercise, hyperventilation is essential to restore the status quo. On the other hand hyperventilation without exercise rapidly lowers the CO_2 level in the lungs, thereby causing a excessive loss of CO_2 from the blood which becomes more alkaline. This alkaline change upsets normal cell function and also interferes with the transfer of oxygen from the blood to the tissues. In addition, the decreased CO_2 tension restricts the blood supply to the brain which no longer receives adequate oxygen, and this induces further hyperventilation.

Reactions: Once hyperventilation becomes well established things can happen fairly rapidly. For instance, in the American study (1957) the handwriting of 70 subjects became illegible within an average of only 2.2 minutes of commencing overbreathing. The higher functions of the brain are disturbed, and electroencephalograms have repeatedly demonstrated abnormal electrical rythem. The odd person loses consciousness.

On the physical side, if carbon dioxide depletion has occured and exercise of some sort is then undertaken, as in climbing, marked fatigue and air-hunger are noted unless, as rarely happens, the CO_2 deficit is wiped out.

While there is a wide individual variation in susceptibility the symptoms which could develop include :

Dizziness	Blurred vision
Lightheadedness	Inability to think clearly
That faraway feeling	Tremors and lack of codination
Marked fatigue	Panic
Rigidity (spasm)	Hysteria.

In the average mild case, any sy ptoms are usually fleeting. Fortunately, it is only rarely that a person displays marked or major symptoms (as in the cases quoted), and only when there is some direct threat to existance, true or inferred. But this is the crux of the matter ; the reaction to hyperventilation, if it occurs, is always inconvenient.

Typical Case Histories

The practical importance of hyperventilation can be illustrated by a few examples:-

Case 1. A recently enrolled member had just made his first decent of the Drum Cave at Bungonia. He had heard all about foul air, but on the spot analyses on this occasion showed that the CO_2 levels encountered were negligeable. Even so, he was conscious of the fact that he was overbreathing.

Of the five persons in this party, he was to be the second last to return to the surface.

When his turn came, during the early stages of the long ladder climb, he rapidly became tired and breathless and had to pause occasionally. He began to rely more and more on the pull on the safety line for assistance and encouragement, and his progress was and unsteady. The support party above were well aware of the increasing load on the safety line, and actually had to manhandle him over the ledge as, by then, he was very fatigued and un-cooperative. His recovery was very rapid.

Comment: A clear cut case of hyperventilation . He was apprehensive of foul air at the outset, and then of the return climb. The apprehension became more marked as his turn came nearer, Then during actual exertion, the symptoms came on very rapidly.

Case 2. S.U. ,is aged 19. He is 5'5" tall and weighs 10 stone. He was making his second trip, and as yet, did not possess his own troglamp.

Whilst following the leader through a simple, though tortuous squeeze, he endeavoured to make up lost ground and became impacted. The leader, meanwhile, proceeded on for a short distance before b ng recalled by the commotion. By now S.U. is firmly wedged and is panicky. He is sweating freely and breathing heavily. He states that he is unable to free himself, says that the air is becoming foul and is uncoperative.

At this stage his actions are becoming clumsy and uncoordinated. The leader advises him to calm down, they have a cigarette, and, ten minutes later, S.U. frees himself without difficulty.

Comment: There was no real obstruction evident here. However, he was lagging behind and the only light passed out of sight, around a bend some distance ahead. S.U. had been dreading an incident of this type, and when a trivial impaction occurred, he rapidly convinced himself that he was, in fact, firmly wedged. Hyperventilation and hysteria produced the remaining symptoms.

Case 3. Like most of us, N.B. is not altogether over enthusiastic about lengthy climbs in caves. While descending the Rhohole, at Jenolan, he feels more and more unsteady and unsure of himself. He begins to slip and "freezes" in position, panting heavily.
Comment: He will requir direct assistance and reassurance, and should be encouraged to relax and breathe easily. The further decent will be uncomplicated.

Case 4. S.R.C. has in mind joining the Cave Diving Group, and is learning to use an aqualung. While swimming offshore at a depth of 25-30ft, under conditions of poor visibility, he lost sight of his partner among the rocks, and was unable to locate him subsequently. His aqualung did not have a contents guage (most don't) and he soon became concerned by the situation.

On noticing the first signs of increasing resistance to breathing, he immediately opened the reserve valve but without effect. Now, thoroughly alarmed and confused, he suspected that the reserve valve was, in fact, initially open. He surfaced briefly and then struck out for the shore. Breathing was becoming very difficult, and the sea was apparently rising rapidly. He surfaced again, and found that he had made little progress. He fought against a peculiar lethargic feeling and although very tired, he finally reached the rocks and was dragged out by some bystanders.

Comment ;- Hyperventilation is more prone to occur when using unfamiliar equipment, when there is any resistance to breathing and when the environment is hostile. All three applied in this case. The overbreathing rapidly fatigues the respiratory musculature when there is any resistance to breathing, so that the resistance seems to increase rapidly. S.R.C. was lucky - he was working beyond his capabilities in open water and came within a cat's whisker of hyperventilating himself right out of this world.

Discussion

The instinct to continue breathing is so strong that whenever our existence is threatened, reflex hyperventilation occurs. In most cases the degree of apprehension or of hyperventilation is unimportant, but, occasionally, a susceptible person will commence a task which he feels is beyond his present capabilities, or will find himself inan unfamiliar and unpleasant situation. If symptoms of hyperventiliation develop, the apprehension will be further agg-

ravated and a vicious circle set up. Hysteria may also play a part either as a primary response to the situation or secondary to the above, but the most important sequelae are fatigue and panic.

To overcome the acute problem, all that is required is sympathetic encouragement from the trip leader, who should be briefed to cope tactfully and competently with cases of hyperventilation, rather than attempt to instill a "push on regardless" attitude. Recovery is remarkably rapid once a normal breathing rythm has been restored.

Conclusion:

In conclusion, Case 5 is presented as a typical instance in another related sphere :-

Case 5 A Second Year medical student is sitting for her first anatomy examination, but the paper seems to be more difficult than usual. After reading through it twice, she begins to feel faint and her vision blurs. In view of the importance of this particular examination, she develops tremors, and becomes apprehensive and miserable.

The symptoms vanish after a glass of water and a few soothing words from a supervisor.

Comment. This too, is an instance of hyperventilation. The remedy is the same, just RELAX - don't puff, don't puff.

Recommendations:

It is recommended that :-

(a) Hyperventilation be recognised as a very real, but easily avoidable hazard in Speleology.

(b) As the mental and physical effects of apprehension and hyperventilation are maximal in new members, attention should be given to careful indoctrination and reassurance in these cases.

(c) When using unfamiliar equipment, and/or techniques, the subject should strive to remain well within his limitations initially.

(d) Trip leaders should be briefed to recognise and cope with cases of hyperventilation.

References: An acknowledgement is made of the value of data and reports published under the auspices of the RCAF and USAF and also Sampson Wright : "Applied Physiologh" 9th Ed. p408

The Author would welcome reports of similar instances. Such information would be treated as confidential.

EUCALYPTUS OIL AND HELICTITES

K. Stillman.

A couple years ago a prominent member of SUSS came forward with the theory that helictites owed their shape to the effects of Eucalyptus Oil. Just how the Eucalyptus Oil came to be involved was not explained, and those who pretended to know everything were quick to dismiss the idea as nonsense. In the face of this derision and antipathy, the theory languished a day or two and then faded from sight, deserted even by its sponsor. It might seem strange, then, that I am taking this theory under my wing, and as a matter of fact I'm not - I just want to put in a good word for it.

Eucalyptus Oil is an example of a "surface active" chemical. It can be firmly absorbed onto surfaces in such a way as to change the nature of the surface. In the case of a crystal, the coated surface would become unavailable for crystal growth and if all the crystal surfaces were blanketed crystal growth would stop. However, because of the lattice structure of most crystals, different faces have a different chemical make-up and can be expected to behave differently towards surface active chemicals. It could happen that certain faces are blanketed while others are not, so that crystal growth would continue only in certain directions. This has been demonstrated with sodium chloride crystals. The addition of urea to NaCl solution causes the resultant crystals to be octahedrons instead of cubes. It seems reasonable to suppose that similar phenomena could occur with calcite to cause distorted growth. Eucalyptus Oil is not essential to the plot, Pine Oil, or any of a huge collection of organic chemicals could be equally effective.

How close this theory approaches the truth is, of course, not known, but it does seem at least as plausible as some other theories.

-xxXxx-

Apropos of an article on foul air atWellington elsewhere in this Journal, the following extract from the N.S.W. Mines Dept. Annual Report 1902 p129, is of passing interest:

"An endeavour has been made to remove the foul air from the new cave without success."

The cave referred to is most probably the Gaden Cave.

-xxXxx-

OF HITCHING.

Doug Miles.

Any rapid perusal of a speleological publication is sufficient to confirm that caving as an end in itself has much to offer the enthusiast. But only a fraction of the activities which are of fundamental importance in speleology have received that emblazoning stamp of recognition which comes when they stand as subjects of publication. Throughout caving literature scientists have eulogized on such weighty subjects as Brachiopods and Diprotodons, while those who have fostered the basic and more elementary aspects of caving have remained mute. For example little or nothing has been written in the fields of the inextricably linked interests of the hitchhiker and the connoisseur of the more stimulating beverages.

Unfortunately hitchhiking, as an art, is drifting the way of many of the humanities under the insidious influence of science, and it seems that its associated activity will do likewise if certain authorities have their way. People talk of the times when "everybody in S.U.S.S., even girls, used to hitch," in the same tones as they would adopt when speaking of Ned Kelly and Cobb & Co; this attitude is more emphatically reflected by the motorist who waves and laughs at this relic of former days as he speeds past him on the highway.

In S.U.S.S. there are perhaps ten confirmed practitioners of the ancient art. Why this should be so it is not for the writer to explain. We can but suggest that with the passing of time members have lost that august quality of miserliness which is one of the foremost traits of the successful hitcher. Above all he must be mean and, once decided on hitching to a point, unwavering in his determination not to spend a penny in so doing. Thus while his less thrifty motoring associate pays out money for petrol, the hitcher devotes his funds to more immediately satisfying liquids.

Hitching offers opportunities for meeting all types of individuals. Some are very nice people. There is the semi-trailer driver, for example, who politely asks you to "just watch" him "smash up that b—— cop at M—— if the b——d tries to book" him. On the other hand there is the furniture removalist who looks at you from the cabin with such a welcoming smile as he slows down to pick you up, and later, again with a smile, looks down from the cabin as you unload his truck.

There are certain recommended methods in hitchhiking which the beginner is advised to adopt, but it matters little where he intends to hitch, or how far, whether from the Union Steps to Tasmania or from the Clock Tower to the Botany Lawn. Both these daring feats have been accomplished by S.U.S.S. members. But, frivolity aside, there are many factors which the hitcher must exploit if he wishes to be successful. To begin with there are many discouragements which he has to face. Hitchhiking is frequently

associated by the press and in the mind of the ordinary individual with the gaol escapee and the criminal. Nothing looks more like a criminal, unfortunately, than a trog after a week in the bush, and since he is dependent as a hitchhiker on the ordinary individual there is a great deal he has to counteract.

Nine out of ten people who pick me up say that they have never picked up hitchers before. The question is how to get such people to stop. One must look like the genuine article: one must look like a member of S.U.S.S., a university student on vacation, and camping clothes, a pack, a blackened billy, a beanie or a bash hat are all passports to success in this regard. It is a very easy thing for a driver to keep his foot on the accelerator when seeing a suspicious character on the road, and a hitcher in such a plight has only a few seconds and no words to attract the attention of a driver and to persuade him to slow down. So above all the hitcher must look the part.

He must endeavour at all costs to gain the trust of the driver, and this is best done through conversation. Calling a middle-aged gentleman "sir" is a good step on the road, but an apt and profitable topic of conversation is the difficulty of hitchhiking nowadays, and how criminal hitchers are spoiling it for the genuine ones. The driver must be summed up as quickly as possible: you must discover where his objections and interests lie, and this demands tact and strategy. For example I once travelled with a talkative and prosperous grazier just after a shearing strike; the next car that stopped for me was driven by a union organizer. Since both talked about the strike, a great deal of flexibility was required as far as my moral support was concerned.

The primary aim is to stay with the driver as long as possible and for this reason one must comply. Thus when the respectable, middle-aged gent gives you a congenial smile and tells you that you don't drink, it is not a good idea to go to the same pub as he does when he stops at the next town. Never press hospitality too far. Don't look to be bought meals and drinks and never accept too many cigarettes: this can lead to embarrassment if the hitcher cannot reciprocate.

The hitcher himself can be helpful in a number of ways. It is a good idea to look for opportunities such as cleaning windscreens, changing tyres on sedans, or checking the oil and ropes on trucks, without being too interfering. This should be done, not for personal advantage, but out of gratitude alone. Such action is a good thing for other hitchers with packs and for the reputation of S.U.S.S. In some cases the driver may feel very indebted to the hitcher. I once walked three miles to get petrol for a car that had run dry, with the result that the driver went one hundred and twenty miles out of his way to put me on a good road.

Some discretion must be exercized in selecting the vehicles in which to hitch. I failed to be careful in this respect once, and

found myself dragged round on an ice delivery for a couple of hours before being taken out half a mile along the highway. The hitcher is usually in a better position hitching away from Sydney than when he is coming back from a trip. For one thing, he usually looks reasonably clean at this stage and can hitch almost any type of vehicle. If he wants to travel quickly it is a good idea to let semi-trailers go by and hitch sedans.

After a week in the bush, however, he usually does not look nearly so presentable, and drivers who are in any way particular about their cars are usually reluctant to stop for such a hitcher, especially if it has been raining. You cannot be fastidious in these circumstances, and one should not be hesitant in hitching semi-trailers. These are slow, but you can be sure of reaching your destination in them.

It is important to remember that any lift can be advantageous: the further one is along the way the greater the number of side roads bringing traffic to the highway, and consequently the greater the chances of being picked up.

In this paper only a few of the superficial elements of hitching have been dealt with. Volumes however would be required for a really intensive analysis of the noble art: this is beyond the capabilities of the present writer who will remain satisfied if, to some extent, members' interest in hitching has been aroused or sharpened, and if in S.U.S.S. at least hitchhiking will not be allowed to die or become a mere tradition of more barbaric days.

HOLLOW CALCITE FORMATIONS.

A. Hunt.

There have recently been several articles published on the subject of hollow, spherical formations of calcite. These have been reported in N.S.S. Bulletins Vol.8 1946 and Vol.12 1950. In one case the formations were in a natural cave, and in the other in a disused mine tunnel. The formations found were in the form of hollow spheres found floating on the surface and at the bottom of particularly still pools. The suggestion is that these spheres have been formed around floating air bubbles which have somehow survived long enough to support the calcite crust.

Although flat crusts of calcite are common in Australian caves, calcite spheres have not yet been reported. If it is found what conditions are necessary for the development of these remarkable structures, it may be possible to predict whether or not they are likely to be found here.

While these formations have not been seen here, hollow formations were found at Jenolan Caves (NSW) on a recent trip (July 1958). The formations observed were seen in the Lily of the Valley branch of the Imperial Cave. In this branch a squeeze was found on this trip leading to a short extension. The walls of this squeeze are flowstone and on them are hollow excrescences of calcite. These are hemispherical in shape, and of about ½" diameter. The method of their formation is unknown, although they may have been formed around a nucleus, such as a small bead of mud.

The author would appreciate hearing of other observations of this kind in Australia.

WEE JASPER 1958.

Alex Jones.

Spring of Wee Jasper, sparkling jasper bright,
In crystal jets from hollow rocks that pour,
As once we passed, sped by the dipping oar,
You burst unlooked for on our wondering sight.
But soon that vision in its first delight
Shall fade forgotten, even as you leap
One moment forth, then in the sombre deep
Are lost — to praise you would that I could write
As of an unknown fountain once before,
While gushing blood still stained its waters cold
And flowers lay strewn, a classic poet told
Thinking its praise should live for evermore.
But though the memory of his song should pass
Still would its babbling arc splash into depths of glass.

L'Air vicieux dans les Grottes: Molong et Wellington NSW.

En l'an 1958 on a fait trois excursions, aux mois de janvier, mars et mai, aux grottes de Molong (360 km. à l'ouest de Sydney), et celles de Wellington (410 km. O.-N.-O. de Sydney), avec comme objet l'évaluation de la concentration du CO2 dans l'atmosphère de ces cavernes. A Molong, avec la concentration du CO2 à 8%, on a éprouvé des difficultés respiratoires, des maux de tête et de la fatigue aux jambes. Comme dans toutes les cavernes, les conditions ont varié d'excursion en excursion, et, bien que la concentration fûsse plus basse que dans les autres grottes, on a senti un plus grand gêne. En mai on a éprouvé moins de malaise et le pourcentage d'oxygène était plus élevé. Malgré une végétation pourrie et malodorante a l'ouverture de la grotte «Gas-Pipe», Wellington, les chiffres obtenus à l'intérieur et en plein air étaient identiques. Là, où la concentration variait à l'intérieur d'une caverne, elle augmentait avec la profondeur. C'est la Grotte Gaden à Wellington qui a présenté les chiffres les plus élevés (12%, 12,5%, 13,5% de CO2). Il semble que l'air vicieux n'est pas homogène et que le gaz s'amasse en petites zones: ce résultat peut être confirmé parce que l'on a obtenu des résultats bien differents bien que dans un tout petit espace. Quelques grottes ont accusé du CO2 de concentration très dangéreuse.

L'Hyperventilation: Péril étrange de la Spéléologie.

L'hyperventilation est une condition où on respire d'une profondeur et d'une fréquence anormales. Salutaire quand elle survient en conséquence de la production excessive au corps du CO2, comme dans l'exercice énergique, ou par suite de la réduction du teneur de l'O2 dans l'air, elle est toujours gênante si d'origine psychologique. L'instinct de continuer à respirer est si fort que toutes les fois que l'on croit que son existence est menacée, l'hyperventilation survient comme un réflexe. Parmi les symptomes possibles on compte l'étourdissement, une fatigue accentuée, le tremblement de membres, un manque de coordination, une vision trouble, la panique, l'hystérie. Il est plus probable qu'il survient quand on se sert d'un équipment peu connu, ou on se trouve en milieu hostile. Le remède est simple et rapide: se relâcher et ne pas haleter. Les spéléologues doivent apprendre à la reconnaitre et à s'en débarrasser.

Испорченный Воздух в Пещерах: Молонг и Веллингтон, Новый Южный Уэльс.

В 1958 году сделали три экскурсии, в январе, марте, и мае, в Молонгские пещеры /в 224 милях к западу от Сиднея/ и в Веллингтонские пещеры /в 256 милях к западно-северо-западу от Сиднея/, чтобы определить содержание углекислоты в воздухе пещер. В Молонге, где концентрация углекислоты дошла до 8%, исследователи заметили затруднения дыхания, головные боли, и слабость в ногах. Как и всегда в пещерах, условия менялись во время этих разных экскурсий, и хотя концентрация углекислоты была ниже чем в других пещерах, неприятные ощущения были хуже. В мае чувство неудобства было меньше, и концентрация кислорода была выше. В пещере "Гас Пайп" в Веллингтоне, у входа которой нашлось количество зловонного и гнилого растительного вещества, отсчеты газов были точно такие же, как в открытом воздухе. Где в разных местах концентрация менялась, она увеличивалась соразмерно с глубиной. Самые высшие концентрации углетислоты зарегистрированные в течение исследования были в пещере "Гаден", в Веллингтоне /12%, 12,5%, и 13,5%/. Оказалось, что испорченный воздух далеко не гомогенный, потому что результаты были иногда разные в одной зоне. По обстоятельство, что отсчеты могли быть проверены снова, и также повторены, чтобы дать подобные результаты, показывает что газ встречается в отдельных гнездах, но не то, что оборудование является неправильным. Потому что вместе с повышением содержания углекислоты наблюдается чуть ли не равное снижение содержания кислорода, с постоянным содержанием азота, кажется, что углекислота генерируется в самой пещере, или недалеко оттуда, и что она только заменяет кислород, который уже был употреблен в производстве углекислоты. Исследователи нашли очень опасные концентрации углекислоты в некоторых из пещер, которые они посетили.

Гипервентиляция: Необычная Опасность в Пещероведении.

Гипервентиляция - состояние человеческого организма, при котором глубина и скорость дыхания патологически увеличены. Она благотворна, когда излишек углекислоты выработался в организме, например после сильного физического упряжнения, или при снижением содержания кислорода в воздухе, но в других обстоятельствах реакция к этому состоянию всегда неудобна. Кровь теряет слишком много углекислоты, и наступает увеличенная щелочность крови. Это нарушает нормальные функции клеток, и головной мозг больше не получает достаточно кислорода, и это в свою очередь вызывает больше гипервентиляции. Возможные симптомы - головокружение, чувство пустоты в голове, усталость, неясное зрение, дрожание, недостаточная координация, паника, и истерия. Инстинкт продолжать дышать так силен, что когда чувствуешь свое существование под угрозой, гипервентиляция имеет природу рефлекса. Она чаще бывает, когда употребляют незнакомый прибор, например аквалунг /водяные легкие/, или когда трудно дышать, и неприятной обстановке. Дыхательная мускулатура скоро утомляется, и кажется, это повышает сопротивление. Это может случаться с экзаменующимися, и особенно с нервыми или неопытными исследователями пещер. Лечение - перестать нервничать и перестать тяжело дышать. Выздоровление скорое, как только востанавливается нормальный ритм дыхания.

Можно рекомендовать, чтобы гипервентиляция признавалась в пещероведении как опасность настоящая, но легко избегаемая, и чтобы руководители экскурсий и новые члены учились ее узнавать, и справляться с ней, если она встречается, и чтобы те, которые употребляют новые аппараты или технику старались сначала хорошо понимать свои ограничения.

Schlechte Höhlenluft: Molong und Wellington NSW.

Im Jahre 1958 wurden im Januar, März und Mai drei Ausflüge zu den Molong Caves (360 Km. westlich von Sydney) und den Wellington Caves (410 Km. west-nord-westlich von Sydney) unternommen, um die in der Höhlenluft enthaltene CO2 Konzentrierung zu messen. In Molong erzeigte die Konzentrierung 8%; Atmungsschwierigkeiten, Kopfschmerzen und Ermüdung der Beine stellten sich ein. Wie in allen Höhlen, änderten sich die Zustände bei jedem Besuch und obgleich die Konzentrierung niedriger als in anderen Höhlen war, war das Gefühl des Unbehagens grösser. Im Mai war das Unbehagen geringer und der Oxygenprozentsatz als höher befunden. Messungen in der Gas Pipe Cave in Wellington, an deren Eingang sich eine Menge schlecht riechender, vermodernder Pflanzen befand, stimmten identisch mit jenen überein, die draussen in der frischen Luft gemacht worden waren. Wo die Konzentrierung sich von Punkt zu Punkt änderte, nahm sie in Tiefe zu. Die höchsten Konzentrierungen von CO2 wurden in der Gaden Cave in Wellington gemessen (12%, 12,5%, u. 13,5%). Es erwies sich alsbald, dass die schlechte Luft bei weitem nicht homogen ist, da manchmal weitaus verschiedentliche Resultate in einem geringen Rauminhalt festgestellt wurden. Die Tatsache, dass die Messungen sofort wiederholt werden konnten und ähnliche Resultate erzielten, deutet an, dass das Gas eher in den Luftsäcken vorkommt, als dass die Apparate fehlerhaft seien. Da die Zunahme in der CO2 Fläche von einem beinah ebenso gleichen Fallen der Oxygenfläche begleitet ist, während der Nitrogeninhalt unverändert bleibt, scheint es, dass das CO2 in oder nahe der Höhle entsteht, indem es einfach an Stelle des Oxygens erscheint, das sich im Laufe der Produktion verbraucht hat. Hoch gefährliche Konzentrierungen von CO2 wurden in einigen der aufgesuchten Höhlen festgestellt.

Hyperventilation: Ungewöhnliche Gefahren der Speleologie.

Hyperventilation ist ein Zustand bei welchem die Schwere und Atmungsschnelligkeit abnorm zunehmen. Es geschieht vorteilhafter, wo der Überschuss an CO2 im Körper hergestellt wird, wie bei anstrengender Bewegung, oder wo der CO2 Inhalt der Luft reduziert wird. In anderen Fällen ist aber die Reaktion ausgeschprochen unangenehmer. Das Blut verliert zu viel CO2 und wird indessen mehr alkalisch. Dieses stört die normalen Funktionen

der Zellen, das Gehirn bekommt nicht mehr genügend Zufuhr von Oxygen - was wieder weitere Hyperventilation verursacht. Mögliche Symptome sind Schwindel, Benommenheit, auffallende Schwäche, verschwommene Sicht, Zittern, Mangel an Koordination, Panik, Hysterie. Der Instinkt das Atmen fortzusetzen ist so stark, dass wenn einem das Leben bedroht ist, sich Hyperventilation als Reflex einstellt. So etwas geschieht leicht wenn man sich ungewohnter Apparate bedient, z.B. eine Aqualunge, bei der ein gewisser Widerstand beim Atmen merklich ist und wo die Umgebung feindlich ist. Die Atemmuskeln werden leicht müde und das scheint den Widerstand zu erhöhen. Es kann einem Kandidaten während eines Examens passieren und insbesondere Speleologisten, die nervös und unerfahren sind. Das Gegenmittel ist sich zu entspannen und auf keinen Fall zu keuchen. Eine Erholung tritt schnell ein sobald normales Atemholen wiederhergestellt ist. Es wird vorgeschlagen, dass Hyperventilation als reeller aber leicht vermeidbarer speleologischer Risk anerkannt wird und dass Anführer und neuer Mitgleider gelehrt werden dies zu erkennen und damit fertigzuwerden, und dass die, die mit ungewohnten Apparaten und Methoden umgehen, den Umständen entsprechend auf ihr Wohl achten.

SYDNEY UNIVERSITY SPELEOLOGICAL SOCIETY — TRIP LOG, 1959/60.

Before leaving on a trip, members are urged to fill in the relevant data and leave this Year Book in a conspicuous place.

DEPARTURE DATE	DESTINATION AND INTENTIONS	LEADER or Friend	ESTIMATED TIME AND DATE OF RETURN.

IN CASE OF ACCIDENT OR IF A TRIP IS OVER-DUE , RING XJ 0218 -- 24 hour service. By courtesy of METROPOLITAN SECURITY SERVICES, one call to the above number will set SUSS Search & Rescue Organisation into operation.

DO NOT NOTIFY PRESS OR POLICE.

Correspondence and contributions to be addressed to:

The Editor

c/o The Sydney University Speleological Society

Box 35, The Union

University of Sydney

Walter Jagger, Printer, Eastwood. WL2679.